Knitr: Why? What? How?

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Why knitr?

Suppose you have a long paper with a couple of experiments sections at the end. You hand-code all your results in tables, input your figures as png files, and refer explicitly to results in paragraphs of LaTeX.

After the paper has been on the arxiv for a few months, you realize that you originally made a mistake downloading your dataset and you have to re-run everything. All of your results will change a little bit.

- *How much work will it be to re-generate everything by hand?*
- *How easy will it be to find everything that needs to be fixed now that you haven't looked at the paper for months?*
- *How will you be sure you fixed everything?*

Knitr uses R code to dynamically produce TeX documents. It's a great solution to the above scenario and more.

Why knitr?

Some other benefits:

- Knitr makes it really easy for other people to reproduce your results.
- Knitr handles figure font sizing extremely gracefully.
- Knitr allows you to use the same figures, tables, and numbers in a posters and presentations with essentially no additional effort.
- Knitr makes it easy to make global style changes (e.g. change the theme of all the graphs).

What knitr?

Knitr is an R package that translates

```
Rnw files (Tex files with code chunks) ->
Tex files
```

It does other things too (e.g. Markdown) but I'll focus on LaTeX.

Part of an .Rnw file:

```
Ordinary LaTeX hare, e.g. $x = y$.
<<r_example2, results="asis">>=
cat(sprintf("1 + 10 = %d", 1 + 10))
@
```

After running knitr becomes a .tex file containing:

```
Ordinary LaTeX hare, e.g. $x = y$.
1 + 10 = 11
```

How knitr?

There are lots of tutorials, for example:

- Josh Davis's beginner's guide
- Overleaf's introduction
- Yihui's (the author's) introduction

This presentation is not a tutorial! The attached zip file has a knitr + LaTeX framework that I use for my papers. It's an example of the sort of things you can do with some helpful (to me) functions and organizing principles.

Check out the README and try to compile the main.pdf document. Then explore and / or try some of the exercises.